

**REMARKS**

Applicants thank the Examiner for acknowledging the claim for priority under 35 U.S.C. § 119, and receipt of a certified copy of the priority document.

Applicants thank the Examiner for considering the references cited with the Information Disclosure Statement filed March 11, 2004.

Applicants note that the Examiner has not returned an initialed copy of the PTO/SB/08 form submitted with the Information Disclosure Statement filed on September 22, 2003.

Applicants therefore respectfully request that the Examiner return an initialed copy of the PTO/SB/08 form.

**Status of the Application**

Claims 1, 3-14 and 16-28 are all the claims pending in the Application, as claims 2 and 15 are hereby cancelled without prejudice or disclaimer, and as claims 27 and 28 are hereby added. Claims 1-26 stand rejected.

Claims 1 and 14 are amended to include the features of dependent claims 2 and 15, respectively. Additionally, claims 1, 3-5, 7-14 and 16-18 and 20-26 are amended herein to improve their readability in a clarifying, non-limiting manner. New claims 27 and 28 describe the recited “unnecessary material,” are fully supported by, for example, pages 36-37 of the instant Application, and are respectfully submitted to be allowable both by virtue of their dependency, and by virtue of the features recited therein.

**Claim Rejections**

The Examiner has rejected: (1) claims 1-6 and 14-19 under 35 U.S.C. § 102(b) as being anticipated by *Rolfson* (US 6,255,228; hereinafter “*Rolfson*”); (2) claims 11, 12 and 24-26 under 35 U.S.C. § 103(a) as being unpatentable over *Rolfson*; (3) claims 7 and 20 under 35 U.S.C. § 103(a) as being unpatentable over *Rolfson* in view of *Sellmer et al.* (US 6,494,221; hereinafter “*Sellmer*”); and (4) claims 8-10 and 21-23 under 35 U.S.C. § 103(a) as being unpatentable over *Rolfson* in view of *Wada et al.* (US 5,879,576; hereinafter “*Wada*”). These rejections are respectfully traversed.

**Independent Claims 1 and 14**

The Examiner takes the position that *Rolfson* discloses all of the features of independent claims 1 and 14. However, Applicants respectfully submit that *Rolfson* fails to teach or suggest that the “etching” (claim 2) or “cleaning” (claim 15) “liquid emitted from said edge nozzle has an emission direction oriented along a rotation direction of said wafer or outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer.”

Specifically, as discussed above, the Examiner alleges that nozzle 21a of *Rolfson* has some correspondence to the “edge nozzle” recited in these claims. However, Applicants respectfully submit that *Rolfson* fails to indicate that any liquid emitted from nozzle 21a is “oriented along a rotation direction of said wafer.” Rather, FIG. 3 of *Rolfson* discloses that nozzle 21a is arranged orthogonally to the surface of wafer 10. Thus, such an orthogonal arrangement can only reasonably be read as providing an orthogonal emission direction, which cannot reasonably be construed as being “along a rotation direction.”

Further, Applicants respectfully submit that *Rolfson* is related to a method of manufacturing a semiconductor wafer utilizing a spin coating device, not an etching or cleaning apparatus similar to that of the instant Application.

Thus, Applicants respectfully submit that independent claims 1 and 14 are patentable over the applied reference.

Additionally, Applicants respectfully submit that rejected dependent claims 3-14 and 16-26 are allowable both by virtue of their dependency, and by virtue of the features recited therein, as discussed in the following sections.

*Dependent Claims 3, 5, 16 and 18*

The Examiner takes the position that *Rolfson* discloses all of the features of claims 3, 5, 16 and 18. However, Applicants respectfully submit that *Rolfson* fails to teach or suggest a “back nozzle for emitting an etching liquid toward a center of a back surface of said wafer” (claims 3 and 5) or “a back nozzle for emitting a cleaning liquid toward a center of a back surface of said wafer” (claims 16 and 18).

Specifically, the Examiner alleges that nozzle 21b of *Rolfson* has some correspondence to the “back nozzle” recited in these claims. However, Applicants respectfully submit that *Rolfson* fails to indicate that nozzle 21b emits any liquid “toward a center of a back surface of said wafer.” Rather, FIG. 3 of *Rolfson* discloses that nozzle 21b emits liquid toward a radially outer portion of the back surface of wafer 10. Further, chuck 12 covers an portion of the back surface of wafer 10 that could be considered central.

Thus, Applicants respectfully submit that independent claims 3 and 16 are patentable over the applied reference.

Additionally, Applicants respectfully submit that rejected dependent claims 12 and 25 are allowable, at least by virtue of their respective dependency from independent claims 3 and 16.

*Dependent Claims 4 and 17*

The Examiner takes the position that *Rolfson* discloses all of the features of claims 4 and 17. However, Applicants respectfully submit that *Rolfson* fails to teach or suggest a “surface nozzle for emitting a protecting liquid toward a center of the first surface of said wafer” to protect the wafer from “etching liquid” (claim 4) or “cleaning liquid” (claim 17).

Specifically, the Examiner alleges that first nozzle 16 has some correspondence to the “surface nozzle” recited in these claims. However, Applicants respectfully submit that *Rolfson* fails to indicate that first nozzle 16 is for emitting any “protecting liquid.” Rather, *Rolfson* discloses that first nozzle 16 emits a liquid that forms a thin solid film on wafer 10. This solid film is not equivalent to the recited protecting liquid.

Thus, Applicants respectfully submit that independent claims 4 and 17 are patentable over the applied reference.

Additionally, Applicants respectfully submit that rejected dependent claims 13 and 26 are allowable, at least by virtue of their respective dependency from independent claims 4 and 17.

*Dependent Claims 6 and 19*

The Examiner takes the position that *Rolfson* discloses all of the features of claims 6 and 19. However, Applicants respectfully submit that *Rolfson* fails to teach or suggest that the “etching liquid emitted from said edge nozzle is beam-shaped,” (claim 6) or that the “cleaning liquid emitted from said edge nozzle is beam-shaped” (claim 19).

Specifically, *Rolfson* fails to teach or suggest that an output of nozzle 21a (or any other nozzle in *Rolfson*) is “beam shaped.” Rather, the disclosed output streams greatly widen from the respective nozzle mouths to the wafer 10. These widening streams are not “beam shaped.”

Thus, Applicants respectfully submit that independent claims 6 and 19 are patentable over the applied reference.

*Dependent Claims 7 and 20*

The Examiner takes the position that a combination of *Rolfson* and *Sellmer* discloses all of the features of claims 7 and 20. However, Applicants respectfully submit that, even if one of ordinary skill would have been motivated to modify *Rolfson* in view of *Sellmer* as the Examiner alleges, the resultant combination would still fail to teach or suggest that the “rotating means is of a roller-chucking type, comprising rollers arranged along an end face of said wafer to hold said wafer and rotate said wafer synchronously.”

Specifically, as the Examiner concedes, *Rolfson* fails to teach or suggest any roller-chucking type device. Rather, *Rolfson* discloses a device where a wafer 10 is supported along most of its bottom surface by spin chuck 12.

Similarly, *Sellmer* discloses that its wafer 10 is provided on a rotatable support 12 with a ring nozzle 14. As can be clearly seen in Figures 2 and 3, no rollers are arranged along any portion of the end face of wafer 10. Rather, *Sellmer* actually discloses a Bernoulli-type chuck

Thus, Applicants respectfully submit that independent claims 7 and 20 are patentable over the applied reference.

*Dependent Claims 8 and 21*

The Examiner takes the position that a combination of *Rolfson* and *Wada* discloses all of the features of claims 8 and 21. However, Applicants respectfully submit that, even if one of ordinary skill would have been motivated to modify *Rolfson* in view of *Wada* as the Examiner alleges, the resultant combination would still fail to teach or suggest that the “rotating means is of a pin-chucking type comprising pins supported by a supporting member and arranged along an end face of said wafer to hold said wafer axially and radially and rotate said wafer synchronously with said member.”

Specifically, as the Examiner concedes, *Rolfson* fails to teach or suggest any such features. Rather, *Rolfson* only discloses a device where a wafer 10 is supported along most of its bottom surface by spin chuck 12.

Further, *Wada* fails to teach or suggest any pins arranged along an end face of wafer 10 that support the wafer both axially and radially. *Wada* only discloses that pins 18 support the wafer 10 radially (col. 4, lines 34-40). Pins 17 disclosed by *Wada* are not arranged along an end face of the wafer 10.

Thus, Applicants respectfully submit that independent claims 8 and 21 are patentable over the applied reference.

*Dependent Claims 9 and 22*

The Examiner takes the position that a combination of *Rolfson* and *Wada* discloses all of the features of claims 9 and 22. However, Applicants respectfully submit that, even if one of ordinary skill would have been motivated to modify *Rolfson* in view of *Wada* as the Examiner alleges, the resultant combination would still fail to teach or suggest that the “rotating means is

of a pin-chucking type comprising first pins and second pins supported by a supporting member; said first pins and said second pins are alternately arranged along an end face of said wafer; and said first pins and said second pins are alternatively contacted with said end face of said wafer to hold said wafer and rotate said wafer synchronously with said member.”

Specifically, as the Examiner concedes, *Rolfson* fails to teach or suggest any such features. Rather, *Rolfson* only discloses a device where a wafer 10 is supported along most of its bottom surface by spin chuck 12.

Further, *Wada* fails to teach or suggest any first pins and second pins arranged along an end face of wafer 10 that alternatively contact the wafer. *Wada* only discloses that pins 18 support the wafer 10 radially at all times (col. 4, lines 34-40).

Thus, Applicants respectfully submit that independent claims 9 and 22 are patentable over the applied reference.

*Dependent Claims 10 and 23*

The Examiner takes the position that a combination of *Rolfson* and *Wada* discloses all of the features of claims 10 and 23. However, Applicants respectfully submit that, even if one of ordinary skill would have been motivated to modify *Rolfson* in view of *Wada* as the Examiner alleges, the resultant combination would still fail to teach or suggest that the “said rotating means comprises first pins and second pins supported by a supporting member; said first pins are arranged along an end face of said wafer and said second pins are arranged along said end face of said wafer; during a first period, said first pins contact said end face of said wafer to hold said wafer and rotate said wafer synchronously with said member, and said second pins do not contact said wafer; and during a second period, said second pins contact said end face of said

wafer to hold said wafer and rotate said wafer synchronously with said member, and said first pins do not contact said wafer.”

Specifically, as the Examiner concedes, *Rolfson* fails to teach or suggest any such features. Rather, *Rolfson* only discloses a device where a wafer 10 is supported along most of its bottom surface by spin chuck 12.

Further, *Wada* fails to teach or suggest any identifiable first pins and second pins arranged along an end face of wafer 10 that alternatively contact the wafer during different time periods. *Wada* only discloses that pins 18 support the wafer 10 radially at all times (col. 4, lines 34-40).

Thus, Applicants respectfully submit that independent claims 10 and 23 are patentable over the applied reference.

*Dependent Claims 11 and 24*

The Examiner takes the position that *Rolfson* discloses all of the features of claims 11 and 24. However, Applicants respectfully submit that *Rolfson* fails to teach or suggest that “the distance of an end of said edge nozzle from a point where a longitudinal axis of said edge nozzle intersects said first surface of said wafer is set as a value in the range of 1 mm to 50 mm, and the angle of said edge nozzle with respect to a tangent of said wafer at said point, in a plane angled toward the first surface of the wafer, is set as a value in the range of 0° to 90°.”

Specifically, as discussed above with respect to independent claims 1 and 14, *Rolfson*, which the Examiner alleges has some correspondence to the recited “edge nozzle,” is arranged orthogonally to the surface of wafer 10. Such an orthogonal arrangement cannot reasonably be construed as being “angled toward the first surface of the wafer.”



Thus, Applicants respectfully submit that independent claims 11 and 24 are patentable over the applied reference.

**Conclusion**

In view of the foregoing, it is respectfully submitted that claims 1, 3-14 and 16-28 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1, 3-14 and 16-28.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,



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